

Research on the Efficacy and Application of Equestrian-Assisted Intervention for Children with Autism

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Abstract: This research aims to discuss the efficacy and application effect of equestrian-assisted intervention for children with autism. Forty cases of children with autism collected from the School of Public Health, Zhejiang University between March 2020 and May 2022 were selected as the subjects of this study and randomly divided into Observation Group (OG) and Control Group (CG), 20 cases in each group. Children in CG were treated with conventional treatment methods such as non-verbal communication, social-emotional communication and attention training in the ASD (Autism Spectrum Disorder) rehabilitation center for six months. The other children in OG were treated with equestrian sports-assisted intervention for six months in addition to the conventional treatment strategies in CG. The frequency of sessions was set to 3 times per week, and the duration of each session was set to 1 hour. The intervention effects of the two groups were compared and analyzed by the end of the six-month treatment. Before the intervention, there was no significant difference in the ATEC scores between the two groups ($P>0.05$). With different treatments, the ATEC scores in both groups decreased after 3 months and 6 months of intervention, compared with those before the intervention. However, the ATEC scores of OG were significantly lower than those of CG, and the difference between the two groups was statistically significant ($P<0.05$). Before the intervention, there was no significant difference in the SRS and CP-GMFQ scores between the two groups ($P>0.05$). With different treatments, the SRS and CP-GMFQ scores of children in both groups decreased after 3 months and 6 months of intervention, compared with those before the intervention. The SRS and CP-GMFQ scores of children in the two groups were not significantly different after 3 months of intervention ($P>0.05$), but the SRS and CP-GMFQ scores of children in OG was significantly lower than that of CG after 6-month intervention, and the difference between the two groups was statistically significant ($P<0.05$). The assisted intervention of equestrian is an advanced treatment. With the systematic animal-assisted intervention, the social and communication, motor function and cognition level of children with ASD have been significantly improved, as well as the imitation ability. It can be seen that the rehabilitation of children with autism has achieved excellent efficacy with the equestrian-assisted intervention.

Keywords: equestrian-assisted intervention; children with Autism Spectrum Disorder (ASD); efficacy

1. Introduction

Autism, also known as infantile autism or Autistic Disorder (AD), is a type of pervasive developmental disorder (PDD) and an important component of Autism Spectrum Disorder (ASD). In 2013, the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, released by the American Psychiatric Association, defined children with ASD as those who present communication and social deficits clearly in multiple situations and who repetitively and stereotyped completion of a particular activity.

Equestrian is the only event that men and women can compete together in the Olympics and contains skills of riding, driving and training horses over obstacles, which requires collaborative work between human and animals. Unlike others, equestrian has the practical use of work and transportation, and also has the meaning of leisure, entertainment and culture. Therefore, physically, equestrian-assisted intervention can take advantage of the human-horse interaction and the regular movement patterns of horses to help the children with autism become more coordinated in their body movement, as well as to exercise their body balance and to enhance their joint mobility and muscle strength. Psychologically, equestrian-assisted intervention can constantly build up the self-confidence and self-esteem of children with autism, enabling them to better adapt to the society and improve their

self-care ability. This paper provides a comprehensive and insightful analysis of the role of equestrian-assisted intervention in the rehabilitation of children with autism using an experimental demonstration method, which enriches the clinical practice experience of animal-assisted intervention and motor intervention for autistic children. It shows that the self-care ability of autistic children was changed fundamentally by the treatment intervention, and they were better to adapt to the society and their families.

2. Information and Methods

2.1 General information

Forty cases of autistic children admitted to the School of Public Health of Zhejiang University between March 2020 and May 2022 were selected as the subjects of this research and randomly divided into observation and control groups, with 20 cases in each group. Among these children, there were 19 boys and 21 girls, aged 5-13 years, with an average age of 8.58 ± 3.05 years. There was no significant difference in general data between the two groups ($P > 0.05$), and comparative analysis could be performed.

Inclusion criteria:

① Children around 9 years of age, and diagnosed with moderate autism; ② Children who have not participated in equestrian within the past 6 months; ③ Children who have not taken autism-related drugs within the past 90 days; ④ Children who voluntarily participate in research work.

Exclusion criteria:

① Children who do not like and are not interested in horses; ② Children with neurodevelopmental disorders and hearing impairment; ③ Children who seriously affect the health of others; ④ Children who are not interested in this research work.

2.2 Research methods

2.2.1 Control Group (CG)

Children in CG were treated with conventional intervention methods such as non-verbal communication, social-emotional communication and attention training in the ASD (autism spectrum disorder) rehabilitation center for six months.

2.2.2 Observation Group (OG)

Children in OG were treated with equestrian-assisted intervention therapy for six months in addition to the conventional treatment strategy. The frequency of sessions per week was set to 3 times, and the duration of each session was set to 1 hour. The children were divided into 4 groups according to their concentration, eye contact with trainers and horses, command comprehension and verbal ability etc.. The children in each group were basically in the same condition and were able to maintain a uniform rhythm during the training, allowing the trainer to carry out active training activities for the whole group.

2.2.3 Equestrian-assisted intervention training

Equestrian sports assisted intervention therapy requires a collaborative effort involving the companions, horse trainers, coaches and rehabilitation specialists to complete the training. It is essential for the parents of the autistic children to have a basic understanding of the entire training activities, so that they can clearly understand the process, principles and precautions of equestrian-assisted intervention training. The process and specific contents of the training include putting on and taking off the equipment correctly, establishing a trusting relationship with the horse, getting close to and stroking the horse, making relevant preparations, acquiring the correct posture on the horse and staying relaxed on the horse. All these training activities are conducted by rehabilitation specialists in terms of language ability, movement completion and behavioral norms.

2.3 Evaluation method

The most common scales used to assess autistic children's condition are Autism Treatment Evaluation Checklist (ATEC), Social Response Scale (SRS), and Cerebral Palsy-Gross motor Function

Questionnaire (CP-GMFQ) etc. Based on the scale results, it is easy to analyze the children's status changes before and after the intervention in an objective way.

ATEC mainly includes four aspects, namely, physical behavior, sensory perception, social skills and verbal ability. It contains more than 70 specific items, and the total score is set to 179. The ATEC is not designed for diagnostic purposes and only measures the changes in ASD severity, making it useful for tracking the efficacy of treatment. The higher the score, the more pronounced the clinical symptoms manifested by the children with ASD.

SRS is the most frequently used scale in the world and plays an important role in screening children with ASD for social interaction and autism. The questionnaire contains more than 60 specific items, each divided into four levels, and the total scale score is set at 195, with increasing scores indicating more severe social impairment.

CP-GMFQ is an objective and accurate evaluation of gross motor function in children with cerebral palsy. The CP-GMFQ scale is easy to use and is relatively practical, so it is used very frequently in the assessment of children, consisting of 14 items, in which each item contains four sub-items, with a total score of 56. The higher the score of the assessment, the better the gross motor function of the child.

3. Results analysis

3.1 ATEC scores of children in both groups before and after the intervention

Before the intervention, there was no significant difference in the ATEC scores between the two groups ($P>0.05$). With different treatments, the ATEC scores in both groups decreased after 3 months and 6 months of intervention, compared with those before the intervention. However, the ATEC scores of OG were significantly lower than those of CG, and the difference between the two groups was statistically significant ($P<0.05$), as shown in Table 1.

3.2 SRS scores of children in both groups before and after the intervention

Before the intervention, there was no significant difference in the SRS scores between the two groups ($P>0.05$). With different treatments, the SRS scores of children in both groups decreased after 3 months and 6 months of intervention, compared with those before the intervention. The SRS scores of children in the two groups were not significantly different after 3 months of intervention ($P>0.05$), but the SRS scores of children in OG was significantly lower than that of CG after 6-month intervention, and the difference between the two groups was statistically significant ($P<0.05$), as shown in Table 1.

3.3 CP-GMFQ scores of children in both groups before and after the intervention

Table 1: ATEC, SRS and CP-GMFQ scores of children in the two groups before and after intervention

Group	Time	ATEC	SRS	CP-GMFQ
Observation Group (OG)	Before intervention	141.98±13.84	159.31±16.41	39.71±9.60
	Intervention for 3 months	134.12±10.12	152.88±17.15	42.31±8.87
	Intervention for 6 months	117.78±14.15	127.38±9.48	49.31±4.18
Control Group (CG)	Before intervention	149.58±16.37	160.11±17.52	43.98±7.73
	Intervention for 3 months	138.78±13.15	153.42±16.52	43.91±7.05
	Intervention for 6 months	130.15±15.74	137.84±12.05	44.98±6.88

Before the intervention, there was no significant difference in the CP-GMFQ scores between the two groups ($P>0.05$). With different treatments, the CP-GMFQ scores of children in both groups decreased after 3 months and 6 months of intervention, compared with those before the intervention. The CP-GMFQ scores of children in the two groups were not significantly different after 3 months of intervention ($P>0.05$), but the CP-GMFQ scores of children in OG was significantly lower than that of CG after 6-month intervention, and the difference between the two groups was statistically significant ($P<0.05$), as shown in Table 1.

4. Discussion

4.1 *Advantages of Equestrian-Assisted Intervention*

First of all, equestrian exercises can fully engage the child's attention. For children with autism, choosing a loyal and honest horse can be of great help. Once the child and the horse have developed a sense of tacit understanding and rapport, the child is able to sit on the horse well. Being around a horse with a gentle personality prevents the child from becoming resistant, which can lead to the desired efficacy of treatment intervention [1].

Secondly, active imitation and participation of children with autism is not required during equestrian sports. Children with autism often have difficulty communicating with other people due to their lack of social and verbal skills. Activities such as running, sports games, ball games, and aerobics require children to pay attention to the movements of others and imitate them, making it difficult for children with autism to integrate into the game without the supervision, accompaniment, and encouragement of parents and coaches. When children are not actively engaged in these activities, the efficacy of these sports interventions can be very limited. However, equestrian-assisted interventions in children with autism are more passive. The child's pelvis swings up and down as the horse runs and walks, and to overcome the swings, the child has to adjust his or her body movements to maintain balance on the horse. In equestrian training activities, the child's body only needs to adjust to the rhythm of the horse's movement and slowly relax. The process of horseback riding is very enjoyable and gives the child a great sense of satisfaction and accomplishment [2].

4.2 *Efficacy on cognitive and social skills of children with ASD*

The impairment of social interaction and cognitive ability of children with ASD is manifested in self-containment, reluctance to communicate, and relatively poor imagination. The intervention treatment can be targeted to improve the attention, self-control and cognitive ability of the children by adding some training activities with more interesting contents. Since equestrianism is the only sport that animals join in, a lot of interaction and perception is required when conducting equestrian training. By observing the command language and physical interaction between the trainer and the horse, the child is able to clearly understand what the horse will do after the trainer gives the command. By practicing the commands and interacting with the horse, it is easier for the autistic child to improve his or her social skills through continuous two-way interaction. During the human-horse interaction, it is more likely to create a bond of trust and affection between the child and the horse, which can gradually relieve the child's anxiety and make it easier for the child to emerge from the negative emotions of self-containment and anxiety, and slowly accept new sensory perceptions[3].

4.3 *Efficacy on gross motor function in children with ASD*

Gross motor dysfunction in children with autism is mainly characterized by inadequate movement, poor muscle strength, low motor skills, low balance, poor endurance, inertia, slow response, poor limb coordination and perceptual impairment. When using equestrian sports assistance interventions, the horse's speed should always be maintained at about 2m/s, which is basically the same as the adult's walking speed. During slow progression, the horse provides the rider with a three-dimensional pattern of movement. Analyzed from the perspective of the sagittal plane axis, the hip joint becomes adducted and abducted. In cross-sectional axes, the hip joint is in extension and flexion. When analyzed from the perspective of the coronal plane axis, the hip joint exhibits external and internal rotation. During the ride, the horse gradually transmits the movements in the three axes to the rider, making the rider feel very comfortable. During the equestrian-assisted intervention, nerve fibers in the body transmit sensations from various parts of the body and the external environment to the central nerve, which, after a series of analyses, transmits them to the appropriate effector. Compared to repetitive sensory stimulation, equestrian sport-assisted interventions will give a positive boost to the intrinsic perception of children with ASD.

5. Conclusion

Compared with traditional interventions, the equestrian-assisted intervention is an advanced treatment. With the systematic animal-assisted intervention, the social and communication, motor function and cognition level of children with ASD have been significantly improved, as well as the

imitation ability. It can be seen that the rehabilitation of children with autism has achieved excellent efficacy with the equestrian-assisted intervention.

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